

# Polybutylene Terephthalate (PBT)

**Category:** Polyester, Thermoplastic

**General Description:** Thermoplastic polyesters are comparable in properties to Nylon 6 and 66 but have lower water absorption and higher dimensional stability. Most PBT is sold in the form of filled and reinforced compounds for engineering applications.<sup>[1004]</sup>

**Processing Method:** Melt processable.

**Applications:** Packaging, automotive, electrical, and consumer markets.

**Permeability:** The barrier properties of BASF Ultradur B 4550 film can be greatly improved by vacuum metallizing with aluminum.

**Permeability Data by Material Supplier Trade Name:** See Table 27-01.

**Table 27-01. Water Vapor, Nitrogen, Oxygen, and Carbon Dioxide Through BASF AG Ultradur Polybutylene Terephthalate**

Material Family	POLYBUTYLENE TEREPHTHALATE
Material Supplier/Grade	BASF AG ULTRADUR B 4550
Reference Number	180

## MATERIAL CHARACTERISTICS

Sample Thickness (mm)	0.25
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## TEST CONDITIONS

Penetrant	water vapor	nitrogen	oxygen	carbon dioxide
Temperature (°C)	23			
Relative Humidity (%)	85%-0% gradient	50		
Test Method	DIN 53122	DIN 53380		
Test Condition Note	standard laboratory atmosphere			

## PERMEABILITY (source document units)

Gas Permeability (cm <sup>3</sup> /m <sup>2</sup> · day · bar)		12	60	550
Vapor Transmission Rate (g/m <sup>2</sup> · day)	10			

## PERMEABILITY (normalized units)

Permeability Coefficient (cm <sup>3</sup> · mm/m <sup>2</sup> · day · atm)		3.04	15.2	139
Vapor Transmission Rate (g · mm/m <sup>2</sup> · day)	2.5			

# Low Density Polyethylene (LDPE)

**Category:** Polyolefin

**General Description:** With the density range of 0.910 to 0.925 g/cu cm, low density polyethylenes are available as base resins, and some grades with additive packages.

**Processing Methods:** Extrusion coating, extrusion, rotational molding, injection molding, blow molding, blown films, and cast films.

**Applications:** Extrusion coatings: liquid packaging, milk cartons, flexible and snack food packaging, and multi-wall bags.

Industrial packaging: shrink films, housewares, and personal care squeeze bottles.

See Ch. 34, *Polyethylene - Overview* for more information.

**Permeability Data by Material Supplier Trade Name:** See Tables 36-01 through 36-10 and Graphs 36-01 through 36-02.

**Table 36-01. Water Vapor, Carbon Dioxide, Oxygen, and Ethylene Oxide Through Low Density Polyethylene**

Material Family	LOW DENSITY POLYETHYLENE (LDPE)
Product Form	FILM
Features	2.5 blow up ratio
Manufacturing Method	blown film
Reference Number	216

## MATERIAL CHARACTERISTICS

Density	0.920 g/cm <sup>3</sup>
Melt Flow Index	4 g/10 min
Sample Thickness (mm)	0.05

## TEST CONDITIONS

Penetrant	water vapor	carbon dioxide	oxygen	ethylene oxide
Test Method	JIS Z0208	ASTM D1434		

## PERMEABILITY (source document units)

Vapor Transmission Rate (g · 100 μm/m <sup>2</sup> · day)	25			
Gas Permeability (cm <sup>3</sup> · 100 μm/m <sup>2</sup> · day · atm)		7900	1500	21,000

## PERMEABILITY (normalized units)

Permeability Coefficient (cm <sup>3</sup> · mm/m <sup>2</sup> · day · atm)		790	150	2100
Vapor Transmission Rate (g · mm/m <sup>2</sup> · day)	2.5			